28. (NEW) The apparatus of claim 27, wherein the housing comprises a pressure vessel.

29. (NEW) The apparatus of claim 27, wherein the housing is filled with air, nitrogen, or argon.

30. (NEW) The apparatus of claim 25, wherein the pipe is sufficiently compliant so that the sensing devices may sense the acoustic pressure variations and the local pressure variations through the wall of the pipe.

31. (NEW) The apparatus of claim 25, wherein the acoustic signal is indicative of the speed of sound in the fluid within the pipe.

32. (NEW) The apparatus of claim 25, wherein the acoustic sensing device comprises a plurality of sensors.

33. (NEW) The apparatus of claim 32, wherein the sensors are spaced equidistantly apart.

34. (NEW) The apparatus of claim 32, wherein the sensors are spaced to sense acoustic pressure variations traveling at the speed of sound in the fluid.

35. (NEW) The apparatus of claim 32, wherein the sensors comprise optical fiber sensors.

36. (NEW) The apparatus of claim 35, wherein each sensor comprises at least one coil of optical fiber wrapped around the circumference of the pipe.

37. (NEW) The apparatus of claim 36, wherein each sensor is separated by at least one fiber Bragg grating.

38. (NEW) The apparatus of claim 25, wherein the velocity signal is indicative of the velocity of the fluid flowing within the pipe.

39. (NEW) The apparatus of claim 25, wherein the flow velocity sensing device comprises a plurality of sensors.

40. (NEW) The apparatus of claim 39, wherein the sensors are spaced equidistantly apart.

41. (NEW) The apparatus of claim 39, wherein the sensors are spaced to sense local pressure variations traveling with the fluid in the pipe.

42. (NEW) The apparatus of claim 39, wherein the sensors comprise optical fiber sensors.

43. (NEW) The apparatus of claim 42, wherein each sensor comprises at least one coil of optical fiber wrapped around the circumference of the pipe.

44. (NEW) The apparatus of claim 43, wherein each sensor is separated by at least one fiber Bragg grating.

45. (NEW) The apparatus of claim 25, wherein the acoustic sensing device and the flow velocity sensing device are coupled by a fiber optic cable.

46. (NEW) The apparatus of claim 25, wherein the acoustic sensing device and the flow velocity sensing device are multiplexed along a common fiber optic cable.

47. (NEW) An apparatus for sensing fluid flow within a pipe, comprising:

an acoustic sensing device to sense acoustic pressure variations traveling at the speed of sound in the fluid, the acoustic sensing device providing an acoustic signal indicative of the speed of sound in the fluid; and

a flow velocity sensing device to sense local pressure variations traveling with the fluid, the flow velocity sensing device providing a velocity signal indicative of the velocity of the fluid flowing in the pipe.

48. (NEW) The apparatus of claim 47, further comprising an optical source optically connected to the apparatus for providing optical power to the acoustic sensing device and the flow velocity sensing device.

49. (NEW) The apparatus of claim 47, further comprising a housing attached to the pipe for enclosing the sensing devices.

50. (NEW) The apparatus of claim 49, wherein the housing comprises a pressure vessel.

51. (NEW) The apparatus of claim 49, wherein the housing is filled with air, nitrogen, or argon.

52. (NEW) The apparatus of claim 47, wherein the pipe is sufficiently compliant so that the sensing devices may sense the acoustic pressure variations and the local pressure variations through the wall of the pipe.

53. (NEW) The apparatus of claim 47, wherein the acoustic sensing device comprises a plurality of sensors.

54. (NEW) The apparatus of claim 53, wherein the sensors are spaced equidistantly apart.

55. (NEW) The apparatus of claim 53, wherein the sensors are spaced to sense acoustic pressure variations traveling at the speed of sound in the fluid.

56. (NEW) The apparatus of claim 53, wherein the sensors comprise optical fiber sensors.

57. (NEW) The apparatus of claim 56, wherein each sensor comprises at least one coil of optical fiber wrapped around the circumference of the pipe.

58. (NEW) The apparatus of claim 57, wherein each sensor is separated by at least one fiber Bragg grating.

59. (NEW) The apparatus of claim 47, wherein the flow velocity sensing device comprises a plurality of sensors.

60. (NEW) The apparatus of claim 59, wherein the sensors are spaced equidistantly apart.

61. (NEW) The apparatus of claim 59, wherein the sensors are spaced to sense local pressure variations traveling with the fluid in the pipe.

62. (NEW) The apparatus of claim 59, wherein the sensors comprise optical fiber sensors.

63. (NEW) The apparatus of claim 62, wherein each sensor comprises at least one coil of optical fiber wrapped around the circumference of the pipe.

64. (NEW) The apparatus of claim 63, wherein each sensor is separated by at least one fiber Bragg grating.

65. (NEW) The apparatus of claim 47, wherein the acoustic sensing device and the flow velocity sensing device are coupled by a fiber optic cable.

66. (NEW) The apparatus of claim 47, wherein the acoustic sensing device and the flow velocity sensing device are multiplexed along a common fiber optic cable.